

SISTG10xx-111-LR(T)

10/100/1000Base-T to 1000Base-X
Industrial Media Converter

Installation Manual

Rev. A

25-Mar-2008

Table of Contents

Trademark, copyright, and product classification information

Trademark

All trademarks and registered trademarks are the property of their respective owners.

Copyright restrictions

FCC warning

This equipment has been tested and found to comply with the limits for class A devices, pursuant to part 15 of FCC rules. These limits are designed to provide reasonable protection against harmful interference in a commercial installation. This equipment generates, uses, and radiates radio frequency energy; therefore, if it is not installed and used in accordance with the instructions in this document, could cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference; the user will be required to correct the interference at the user's own expense.

CE Mark

CE Marking *(European Conformity)*: This is a Class A product. In a domestic environment, this product could cause radio interference; as a result, the user may be required to take adequate preventative measures.

About this product and manual

Industrial Media Converter

The SISTG10xx-111-LR(T) Industrial Media Converter provides a 10/100/1000Base-T *(RJ-45)* copper connection and a 1000Base-X fiber connection with either a fixed optical transceiver or an SFP port. These Media Converters are hardened devices designed to reliably operate in harsh environments such as those found on factory floors, outdoor enclosures or other hazardous environments.

Term/usage

In this manual, the term "Media Converter*" (first letter upper case)* refers to the SISTG10xx-111-LR(T) 10/100/1000Base-T to 1000Base-X Industrial Media Converter.

About this manual

This manual provides instructions on how to install, configure, and operate the SISTG10xx-111-LR(T) 10/100/1000Base-T to 1000Base-X Industrial Media Converter.

Manual structure

This manual has a beginning table of contents; also, at the beginning of each section there is a table of contents. As you traverse the manual, note the side headings. These side headings make it easier to find specific information. The manual sections are as follows:

Section	Description
I	Media Converter general description, ordering information, package contents and physical features/description
II	Installation and operation of the Media Converter
III	Advanced features
IV	Cable Specifications
V	Troubleshooting
VI	Contacting Transition Networks, product warranty and product compliance information
Appendix A	Presents product specifications, notices, and warnings

Cautions and warnings

Cautions and warnings

Make sure that you read and understand all content identified by these two symbols:

Cautions and warnings appear here and throughout this manual where appropriate. Failure to read and understand the information identified by the "caution" and "warning" symbols could result in poor equipment performance, damage to equipment, or injury to persons.

Cautions

Cautions indicate the possibility of damage to equipment.

CAUTION
Make sure that the Media Converter is mounted with proper space around it for ventilation *(heat dissipation)*. Failure to observe this caution could result in damage to the Media Converter.

CAUTION
Please exercise caution when using power tools. Do not install this unit in damp or wet locations, or in close proximity to very hot surfaces. Failure to observe this caution could result in damage to the Media Converter and cables.

CAUTION
Only qualified persons should install the Media Converter. Failure to observe this caution could result in poor performance or damage to the Media Converter.

CAUTION
Install the Media Converter in an environment where the temperature range will not exceed the stated environmental specifications for the particular model being installed. Failure to observe this caution could result in permanent damage to the Media Converter.

CAUTION
DO NOT install the Media Converter in areas where strong electromagnetic fields (EMF) exist. Failure to observe this caution could result in poor Media Converter performance and data corruption.

CAUTION
The Media Converter must be mounted to a well-grounded surface. Failure to observe this caution could result in EMI problems.

CAUTION
When connecting DC power wires to the terminal-block plug, pay close attention to the polarity markings shown near the terminal block of the Media Converter. Failure to observe this caution could result in damage to the equipment.

CAUTION
This is a Class A product. In a residential environment, this product could cause radio interference in which case the user may be required to take adequate corrective measures.

Continued on next page

Cautions and warnings, continued

Warnings

Warnings indicate the possibility of injury to persons.

WARNING

Be sure to disconnect power before installing and wiring the Media Converter. Failure to observe this warning could result in an electrical shock.

WARNING

Fiber optics: Visible and invisible laser radiation when open: DO NOT stare into the beam, or directly view the beam with optical instruments. Failure to observe this warning could result in an eye injury or blindness.

WARNING

Use of controls, adjustments or the performance of procedures other than those specified herein may result in hazardous radiation exposure.

Section I
SISTG10xx-111 Industrial Media Converter

In this section These are the topics:

General description

Overview

The SISTG10xx-111 Industrial Media Converter can help eliminate EMI or RFI issues and help to overcome distance limitations with copper-based cabling by providing a fiber interface to transport data from copper-based industrial networking and communication devices over fiber optic cabling.

Each Media Converter can connect to either 10Base-T or 100Base-TX or 1000Base-T copper ports and provides a 1000Base-X fiber optic connection. Multiple connector options are offered as well as two distinct operating temperature ranges:

- Standard: -10℃ to +50℃ (14℉ to +122℉)
- Extended: -40℃ to +65℃ (-40℉ to +149℉)

Features

The SISTG10xx-111 Industrial Media Converter has the following features:

- Auto-Negotiation
- AutoCross™
- Link Pass Through
- Dual, redundant auto-sensing 12 to 48VDC inputs with reverse polarity protection and over current protection
- Dry Contact Relay alarm output for failure of primary or redundant power input
- IEEE 802.3x flow control support
  - ► Flow control on full-duplex
  - ► Back pressure on half-duplex
- DIN-Rail mounting bracket (installed)
- Wall mount brackets included
- DIP-switches to set Power Alarm and Link Pass Through
- Barrel connector interface cable included for use with external AC/DC power supply (order separately)
- IP30 protection metal enclosure
- Lifetime Warranty

SISTG10xx-111 Industrial Media Converter part numbers

Standard models

The part numbers shown in Tables 1 and 2 perform as described in this manual.

Table 1: Industrial Media Converter Part Numbers

<u>Standard Operating Temperature</u> (-10°C to +50°C)

Part Number	Port 1: 10/100/1000Base-T	Port 2: 1000Base-X
SISTG1013-111-LR	RJ-45 100 m *(328ft)*	SC, 850 nm multimode [62.5/125µm: 220 m/722 ft.] [50/125µm: 550 m/1804 ft.]
SISTG1014-111-LR	RJ-45 100 m *(328ft)*	SC, 1310 nm single mode 10 km *(6.2 miles)*
SISTG1040-111-LR	RJ-45 100 m *(328ft)*	SFP slot *(empty)*

Table 2: Industrial Media Converter Part Numbers

<u>Extended Operating Temperature</u> (-40°C to +65°C)

Part Number	Port 1: 10/100/1000Base-T	Port 2: 1000Base-X
SISTG1013-111-LRT	RJ-45 100 m *(328ft)*	SC, 850 nm multimode [62.5/125µm: 220 m/722 ft.] [50/125µm: 550 m/1804 ft.]
SISTG1014-111-LRT	RJ-45 100 m *(328ft)*	SC, 1310 nm single mode 10 km *(6.2 miles)*
SISTG1040-111-LRT	RJ-45 100 m *(328ft)*	SFP slot *(empty)*

Note: The distances for ports 1 and 2 listed in Tables 1 and 2 are typical maximum distances; the physical characteristics of the network will affect the actual distances.

Table 3: Optional Accessories (sold separately)

Part Number	Description
SPS-UA12DHT-xx	External power supply includes: (1) AC/DC power supply, 100-240VAC input, 50-60Hz, 12VDC, 1.5A ouput, -25°C to +70°C operating temp. (1) Regional specific power cord (1) Barrel connector interface cable

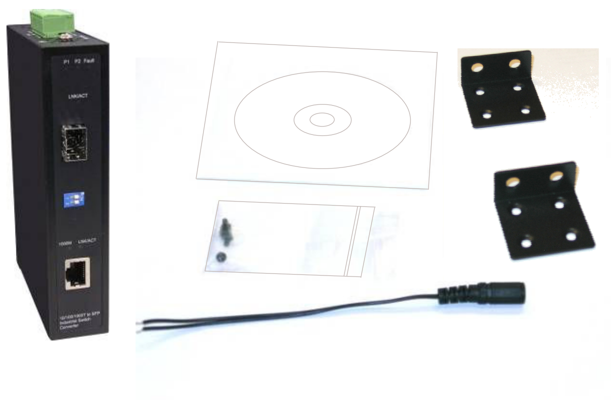
Note: Replace the xx in the part number above with one of the following identifiers to match the region where the Media Converter will be installed:

NA = North America	JP = Japan	OZ = Australia/New Zealand
UK = United Kingdom	EU = Europe	SA = South Africa

Package contents

Package contents

Quantity	Description
1	10/100/1000BaseT to 1000BaseX Industrial Media Converter
1	DIN-Rail mounting bracket (installed)
2	Wall mount brackets
8	Screws (for attaching wall-mount bracket)
1	Installation manual CD
1	Barrel connector interface cable - For external AC/DC power supply (sold separately)



Compare the package contents of your industrial media converter with the standard checklist above. If any item is damaged or missing, please contact Transition Networks Technical Support.

Physical description

Physical dimensions

Width: 1.2" [30mm]
Height: 5.5" [140mm]
Depth: 3.7" [95mm]

Front panel

The front panel of the Media Converter is shown in Figure 1 with corresponding descriptions listed below:

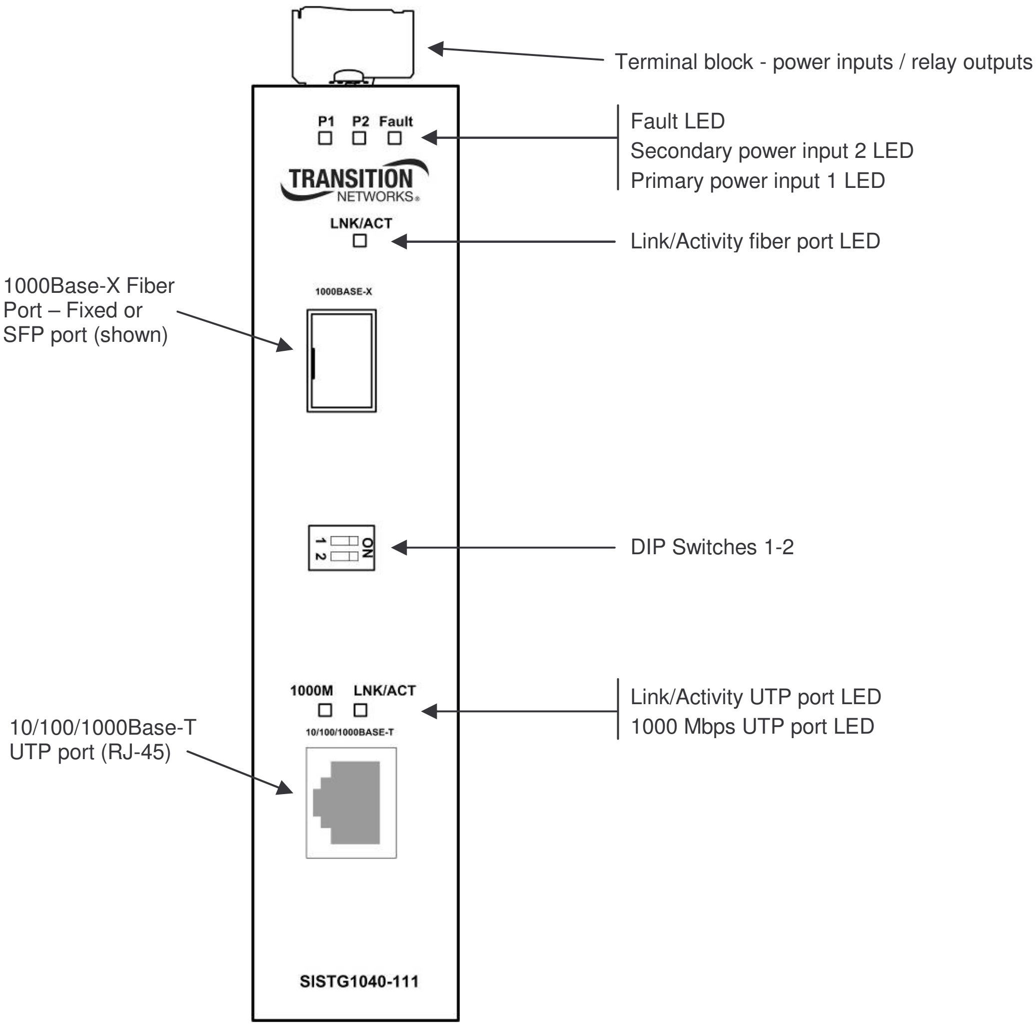


Figure 1: SISTG10xx-111-LR(T) Industrial Media Converter *(Front View)*

Continued on next page

Physical description, continued

Bottom panel

The top view of the Media Converter is shown in Figure 2 with corresponding descriptions listed below:

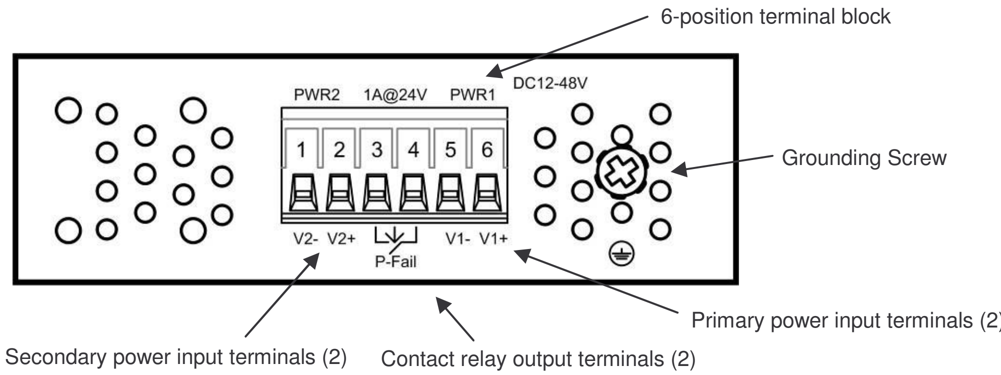


Figure 2: SISTG10xx-111-LR(T) Industrial Media Converter *(Top View)*

Back panel

The back view of the Media Converter is shown in Figure 3 with corresponding descriptions listed below:

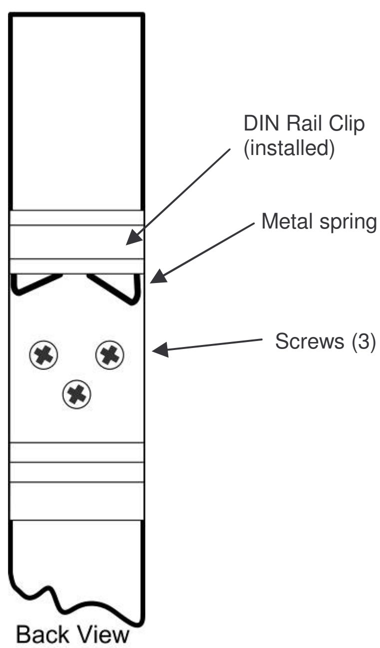


Figure 3: SISTG10xx-111-LR(T) Industrial Media Converter *(Back View)*

Section II
Installation

In this section

These are the topics:

DIN rail mounting

DIN rail clip

The Media Converter includes an aluminum DIN Rail Clip attached to the rear panel. Verify the clip is attached and oriented as pictured in Figure 4 below.

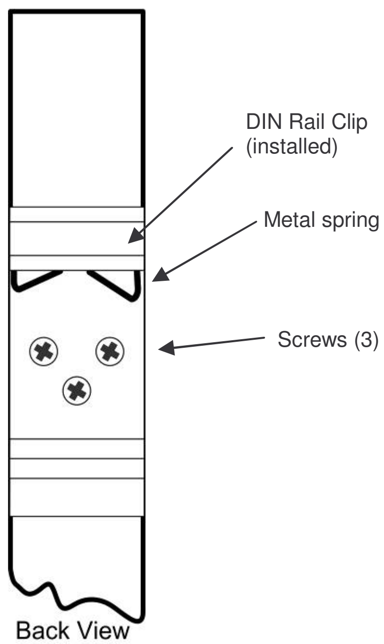


Figure 4: Mounted DIN Rail Clip

DIN rail mounting considerations

Consider the following before mounting the DIN rail to a surface and attaching the Media Converter:

- The surface must support at least 450g *(1.0 lbs)* for the Media Converter.
- Do not place heavy objects on the Media Converter.

⚠ **CAUTION**
Mount the Media Converter with proper spacing around it for ventilation *(heat dissipation)*. Failure to observe this caution could result in damage to the Media Converter.

⚠ **CAUTION**
Please exercise caution when using power tools. Do not install this unit in damp or wet locations, or in close proximity to very hot surfaces. Failure to observe this caution could result in damage to the Media Converter and cables.

Continued on next page

DIN rail mounting, continued

DIN rail mounting

To mount the Media Converter to the DIN rail, see Figure 5 and do the following:

Step	Action
1.	Align and then position DIN-Rail-clip spring to the top of the DIN rail as shown in Figure 5, step (a).
2.	Press DOWN on the Media Converter and then IN to snap it into place on the DIN Rail. See Figure 5, step (b).

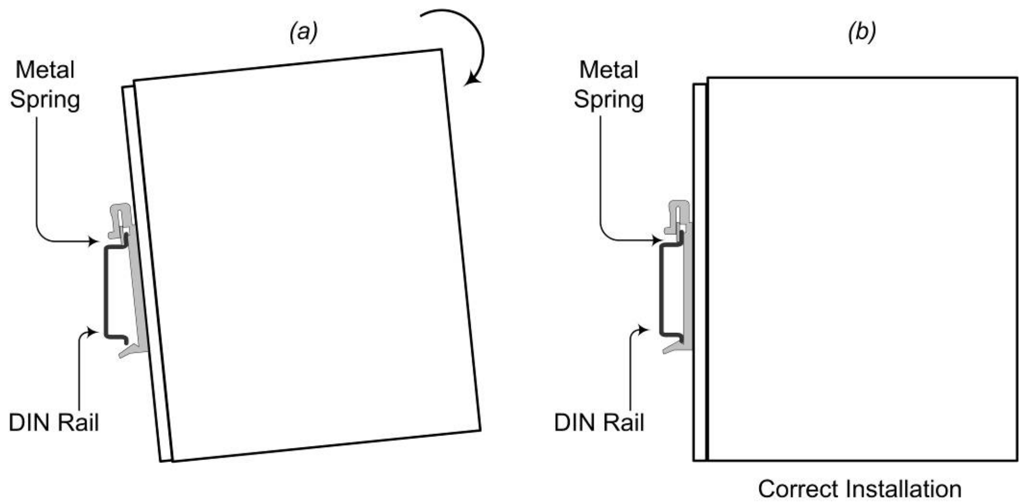


Figure 5: Industrial Media Converter Mounting to DIN Rail

To remove the Media Converter from the DIN rail, reverse the steps above.

Wall mounting

Wall mount bracket

The Media Converter includes a wall mount bracket and screws in the contents of the shipping package. The wall mount bracket can be attached to the rear panel of the Media Converter to enable mounting to a vertical surface such as the wall of an enclosure. Locate the brackets (2) and screws (8) and follow the steps below to install the bracket on the Media Converter.

Wall mount bracket install

To install the wall mount bracket to the Media Converter, see Figure 6 and do the following:

Step	Action
1.	Remove existing screws (3) and DIN-Rail bracket from rear of Media Converter.
2.	Locate wall mount brackets (2) and screws (8) from Media Converter packaging.
3.	Place brackets in correct orientation as shown and insert and tighten screws to secure bracket to the top and bottom of Media Converter.
4.	Mount assembled device to a wall per locally accepted practices for anchoring and securing. (Wall mount screws not included.)

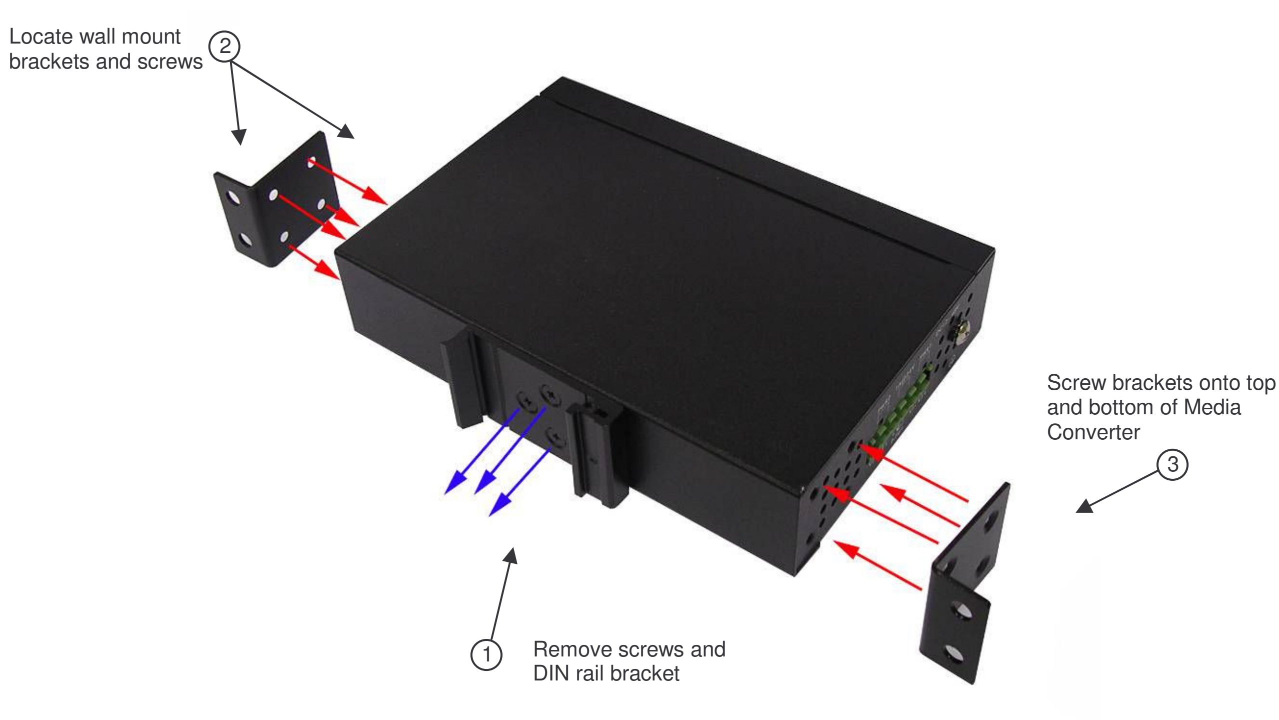


Figure 6: Installing wall mount brackets to Industrial Media Converter

Grounding the Media Converter

⚠ **CAUTION**
Be sure to disconnect the Media Converter from the DC power source before installing and wiring the device.

Wiring considerations

The following wiring considerations are recommended:

- Signal lines must not be directly connected to outdoor wiring.
- Use separate paths or conduits to route wiring for power and device data cables. To avoid interference, wires with different signal characteristics route separately. If power wiring and device data cables must cross make sure that the wires are perpendicular at the intersection point.
- Use the type of signal transmitted through a wire to determine which wires should be kept separate. The rule of thumb is wiring that shares similar electrical characteristics can be bundled together.
- Keep input and output wiring separated.

⚠ **CAUTION**
The Media Converter is intended to be grounded to a well-grounded mounting surface such as a metal plate. Install the grounding wire prior to connecting any other device to the Media Converter.

Media Converter grounding

Grounding the Media Converter helps limit the effects of noise due to electromagnetic interference (EMI) via proper grounding. Always run the ground connection from the ground screw to a grounding surface before connecting the Media Converter to a DC power source. See Figure 7.

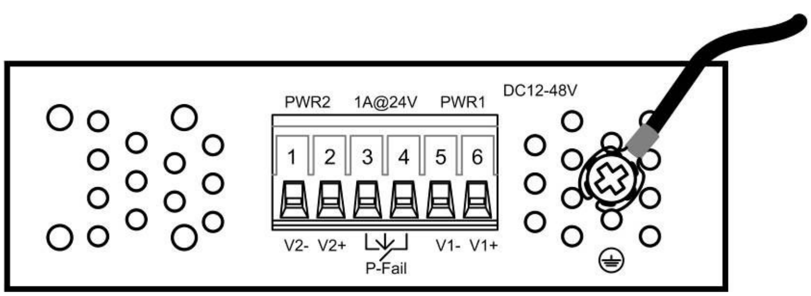


Figure 7: Industrial Media Converter Ground Screw (*Top Panel*)

Connecting power to the Media Converter

Redundant power inputs

The Media Converter has dual *(redundant)* power inputs capable of auto-sensing the input voltage, while providing over current protection and reverse polarity protection.

The dual power inputs can be connected simultaneously to live DC power sources. See Figure 8. If one power source fails, the other live source acts as a backup, and automatically supplies the Media Converter with power.

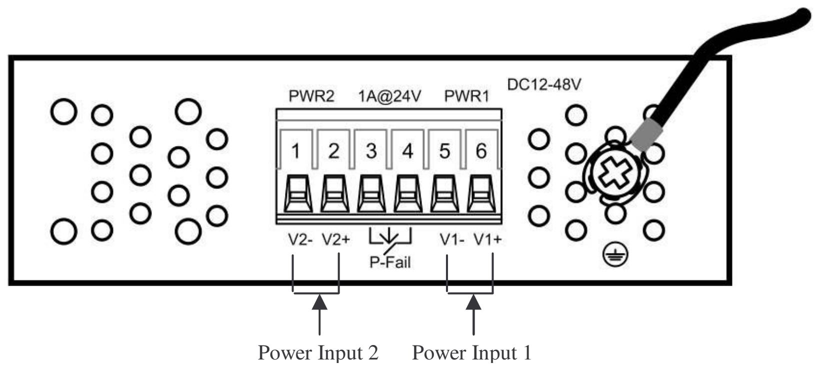


Figure 8: Redundant Power Connections

IMPORTANT

- Power is supplied through an external 12-48 VDC power source. Check the Technical Specification section for details about the DC power input voltage.
- The Media Converter does not include a power switch; therefore, plugging a wired and active terminal-block plug into its terminal block will immediately power ON the unit.

⚠ **CAUTION**
Before connecting the Media Converter to a DC power source, ensure the power source is stable.

⚠ **CAUTION**
This device is intended to be supplied by a listed power source marked LPS or Limited Power Source, provided with a connector for field wiring terminal.

⚠ **CAUTION**
This device is designed for operation with a safety extra-low voltage (SELV) in compliance with IEC950 / EN60950 / VDE0805 and in compliance with the low voltage directive 73/23/EEC and 93/68/EEC.

Continued on next page

Connecting power to the Media Converter, continued

Note: The terminal block can accept 12 – 24 AWG wire for power and alarm relay inputs.

Terminal-block wiring

To wire the 6-position terminal block for redundant power, do the following:

Note: The 6-position terminal-block plug is constructed *(keyed)* to mate with the Media Converter terminal block. When wiring the plug for power, use the polarity markings next to the terminal block and on top of the plug to ensure proper connection.

Step	Action
1.	Turn the external power source OFF.
2.	Strip the power wires as required.
3.	Insert one stripped power wire into the terminal block plug. Observe polarity. See Figure 9.
4.	Secure the wire using a flathead screwdriver by tightening the contact screw. See Figure 9.
5.	Repeat Steps 3 and 4 until all wires are installed and secured.

Terminal-Block Plug 3 Views

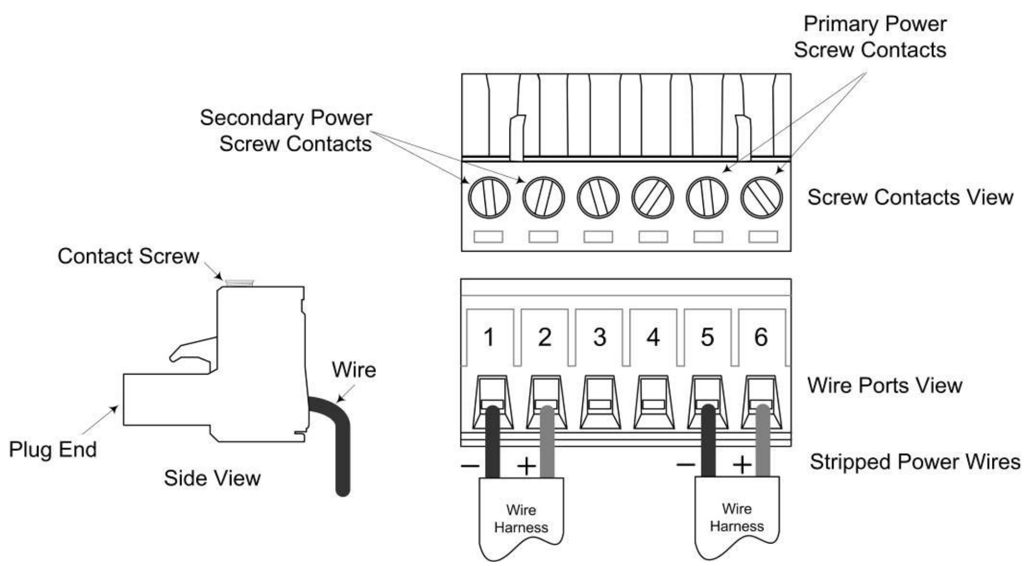


Figure 9: 6-Position Terminal-Block *(Primary/Redundant Power Wiring)*

Continued on next page

Connecting power to the Media Converter, continued

Terminal-block wiring *(continued)*

Step	Action
6.	Insert the terminal block plug into the Media Converter's terminal block, as shown in Figure 10.

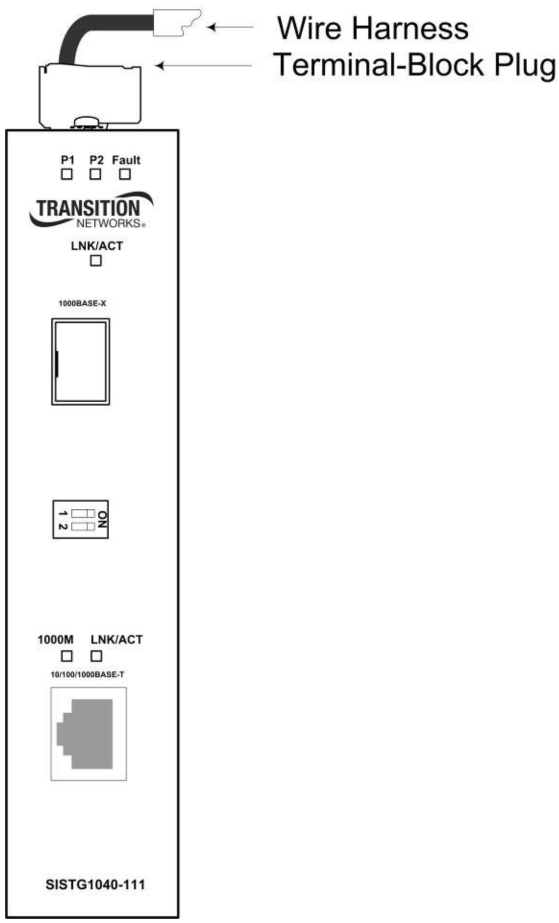


Figure 10: Wired Terminal Block Plug Inserted Into Media Converter

Step	Action
7.	Make sure that the DC power source is stable and clean.
8.	Turn ON the power source and the PWR LED should turn ON along with PWR 1 LED and/or PWR 2 LED, depending on whether one or both power supplies are connected and turned ON.

Connecting power to the Media Converter, continued

Barrel connector interface cable

A barrel connector interface cable is included with the Media Converter and can be used to convert the barrel connector output of an external AC/DC power supply over to a wire interface that can then be inserted into the terminal block following the instructions and figure 9, both located on page 13 of this manual.

Note: An external AC/DC power supply is not included with the Media Converter. Transition Networks offers an accessory power supply that can be purchased separately, if required. Please see optional accessories in the general information section of this manual for ordering information.

⚠ **CAUTION**

The operating temperature of the Media Converter, when used in conjunction with an AC/DC power supply will be limited to the lesser operating temperature range of either device.

For example: SISTG10xx-111-LRT (-40ºC to +65ºC operating temp) used with SPS-UA12DHT-xx (-25ºC to +65ºC operating temp)

Operating temp for combination is -25ºC to +65ºC

Step	Action
1.	Locate the barrel interface cable included in the Media Converter packaging.
2.	Strip the power wires as required.
3.	Insert one stripped power wire into the terminal block plug, Observe polarity. See Figure 9 on page 13.
4.	Secure the wire using a flathead screwdriver by tightening the contact screw. See Figure 9 on page 13.
5.	Repeat Steps 3 and 4 until all wires are installed and secured.
6.	Locate an external AC/DC power supply with barrel connector interface and make sure the power supply is not plugged into any power source.
7.	Insert barrel connector into the receptacle on the interface cable. See Figure 11.



Figure 11: Barrel Connector Interface Cable with external power supply

Step	Action
8.	Plug external AC/DC power supply into an external power source.
9.	Turn ON or plug in the external power supply and the PWR LED should turn ON along with PWR 1 LED and/or PWR 2 LED, depending on whether one or both power supplies are connected and turned ON.

Connecting an alarm fixture

Alarm relay

The Media Converter has dry relay contacts for connecting an external alarm fixture. Located on the green terminal block on the top panel, the relay has "normally open" contacts that can be wired to form a circuit for triggering an external alarm when a fault occurs *(light or audible alarm)*. See Figure 12.

Note: Normally open contacts are contacts that form an open circuit when there is a loss of power to the device or when a fault occurs. Once power is applied to the Media Converter, the contacts will be closed and current will flow through the contacts.

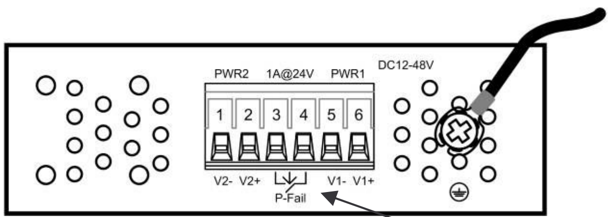


Figure 12: Alarm Relay Contacts

Alarm relay wiring

To wire an alarm to the relay contacts, do the following:

Step	Action
1.	Verify that the external power source is turned OFF.
2.	Strip the wires as required.
3.	Wire the alarm relay as shown in Figure 13.

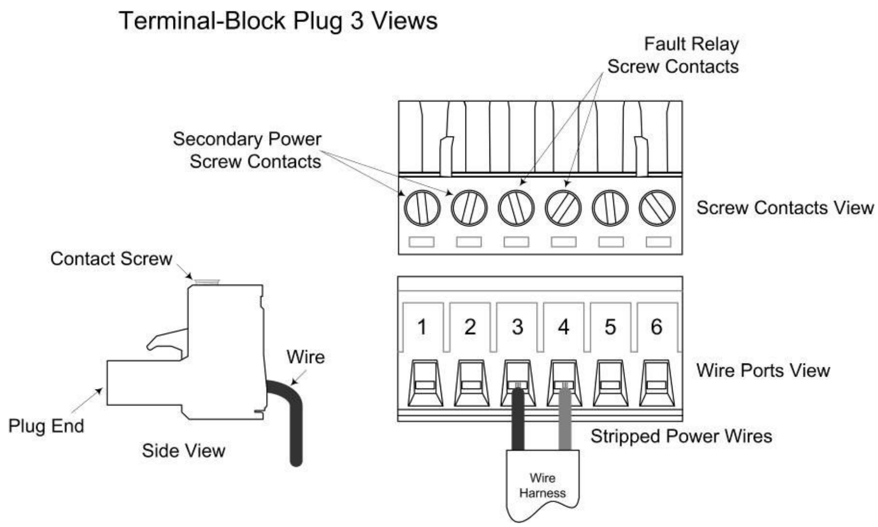


Figure 13: Alarm Relay Wiring

Continued on next page

Connecting an alarm fixture, continued

Fault indications

Wire the relay contacts to any warning light or audible alarm in the control room as shown in Figure 14. When a fault occurs, the relay contacts open, stopping the flow of current through the contact circuit. This will disable the external alarm or turn OFF a light, indicating a fault. An alarm will occur under the following conditions:

- Power failure to either of the Media Converter power inputs:
  - Power wires are disconnected, power source malfunction
  - Input power is out of this range: 12 – 48VDC

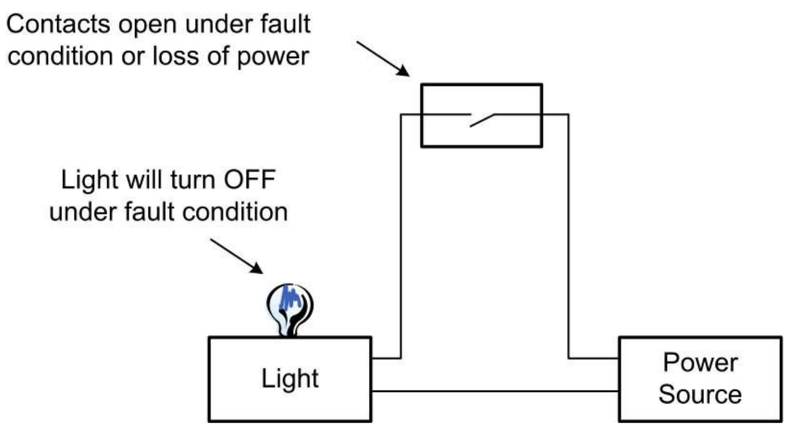


Figure 14: Alarm Relay Contacts

Note: DIP switch #1 (Power alarm) must be enabled [ON] for the contact relay circuitry to work as described in the manual. Fault notification will not take place if the power alarm switch is disabled [OFF].

Connecting fiber cables

Fiber cable installation

When connecting fiber cables to the 1000BASE-X port on the Media Converter, make sure the correct type is used: LC or SC.

To install the fiber cables, do the following:

Step	Action
1.	Remove and keep the fiber-port protective dust cover(s).

Note: When not connected to a fiber cable, keep the protective cover(s) on the optical ports to protect the optics and keep dust and debris from entering the optical interface.

2.	Check that the fiber connectors on the fiber-optic cabling are clean. If necessary, clean the fiber connectors using locally accepted cleaning procedures.

Note: Dirty fiber connectors on fiber optic cables will impair light transmission quality through the cable and lead to degraded performance on the port.

3.	Connect the fiber cable as shown in Figure 15.

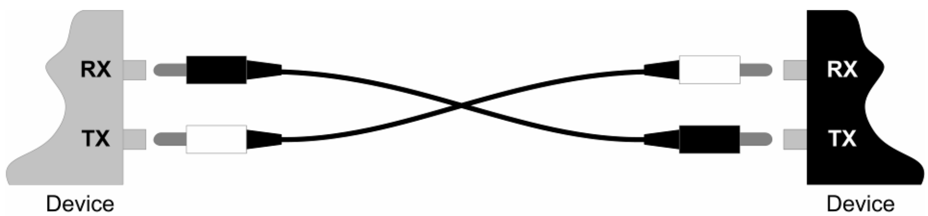


Figure 15: Fiber Cable Connections

4.	Check the corresponding fiber port LED on the Media Converter to verify the connection—LNK/ACT LED should be lit.

Warning

- Visible and invisible laser radiation when open: DO NOT stare into the beam, or directly view the beam with optical instruments. Failure to observe this warning could result in an eye injury.
- Use of controls, adjustments or the performance of procedures other than those specified herein may result in hazardous radiation exposure.

Connecting copper cables

Copper cable installation

To connect the copper cable to the Media Converter and other equipment, do the following:

Step	Action
1.	Locate or build 10Base-T or 100Base-TX or 1000Base-T compliant copper cables with male, RJ-45 connectors installed at both ends.
2.	Connect the RJ-45 connector at one end of the cable to the RJ-45 port on the media converter. See Figure 16 below.
3.	Connect the RJ-45 connector at the other end of the cable to the RJ-45 port on the other device (switch, workstation, PLC, etc.).
4.	Check the copper port LED on the Media Converter to verify the connection—LNK/ACT LED should be lit.

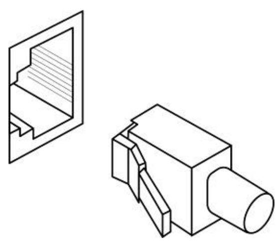


Figure 16: Copper Cable Installation

Copper cable configuration

Either a straight-through or cross-over cable may be used. See Figure 17.

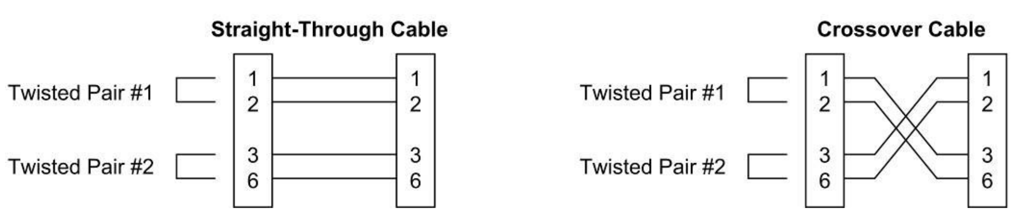


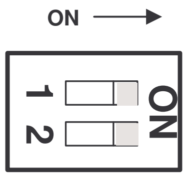
Figure 17: Straight-Through and Crossover Cables

Note: The AutoCross™ feature determines the characteristics of the cable connection and automatically configures the unit to link up, regardless of the cable configuration, allowing either straight-through (MDI) or crossover (MDI-X) cables to be used. (Requires no operator intervention.). See Advanced Features section for more information.

DIP Switches

DIP switch position descriptions

The Media Converter features two DIP switches on the front panel used to configure the Media Converter for use in a particular network setting. Figure 18 shows the DIP switches and a chart that explains each setting.



No	Description	Default
1	Power Alarm (enable ON, disable OFF) *If either PWR1 or PWR2 input fails, the fault LED will light up and the alarm contacts will open*	OFF
2	Link Pass Through (enable ON, disable OFF) *See Advanced Features, Page xx*	OFF

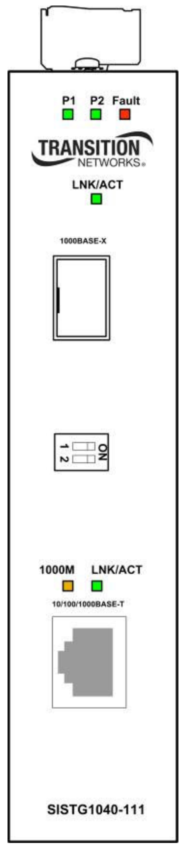
Figure 18: Dip Switch Settings and Explanations

⚠ **CAUTION**
DIP switch changes will not become active until the Media Converter is power cycled *(turned OFF then ON)*.

Light Emitting Diodes (LEDs)

LEDs

The Media Converter has LED indicators located on its front panel. The LEDs present at-a-glance network status, and provide real-time connectivity information. Figure 19 shows the LEDs and a chart that explains the function of each.



LED	Description
P1	Green = input power present on PWR1 input
P2	Green = input power present on PWR2 input
FAULT	Red = Loss of either power input *(DIP switch #1 must be enabled [ON])*
LNK/ACT (Fiber port)	Green = fiber link Green (blinking) = fiber port is receiving link pulses or data from a 1000Base-X compliant port
1000M	Yellow = 1000Mbps Off = 10Mbps or 100Mbps or no link
LNK/ACT (UTP port)	Green = UTP link Green (blinking) = UTP port is receiving link pulses or data from a 10/100/1000Base-T compliant port

Figure 19: LEDs and Description Chart

Section III:
Advanced Features

Introduction

This section provides an explanation of the advanced features on the Media Converter.

In this section

These are the topics:

Advanced Features

AutoCross™

AutoCross™ automatically detects and configures the twisted pair port on the converter to the correct MDI or MDI-X configuration allowing either straight-through (MDI) or crossover (MDI-X) cables to be used – see figure 20. No user intervention is required.

* Eliminates an entire category of troubleshooting
* No need to identify cable type; straight-through or crossover
* No user intervention required to determine correct button / switch settings

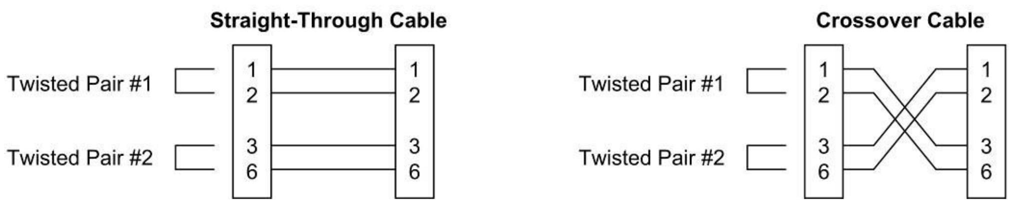


Figure 20: Straight-Through and Crossover Cables

Auto-Negotiation
(IEEE 802.3u)

Auto-Negotiation allows devices to perform automatic configuration to achieve the best possible mode of operation over a link. The Media Converter will broadcast its speed (10Mbps, 100Mbps, 1000Mbps) and duplex (half/full) capabilities to other devices and negotiate the best mode of operation between the two devices.

* No user intervention required to determine best mode of operation
* Optimal link established automatically
* Quick and easy installation

Note: If the Media Converter is connected to a non-negotiating device over the copper link, it will default to 10Mb/s speed, half duplex mode.

Pause
(IEEE 802.3xy)

PAUSE signaling is an IEEE feature that is used to temporarily suspend data transmission between two devices in the event that one of the devices becomes overwhelmed. In the event that a device needs some time to clear network congestion, it will send out a PAUSE signal to the other end device, which will then wait a pre-determined amount of time before re-transmitting the data. Transition's converters will pass PAUSE signaling unhindered; ensuring that the message is delivered to the end device.

* PAUSE enabled devices allowed to work properly
* Prevents loss of valuable data transmission
* Reduces bottlenecks and allows for efficient use of network devices

Note: PAUSE signaling is not standardized over fiber media. Transition's media converters will communicate this signaling over fiber between the converters to pass this signaling on to the other end device.

Advanced Features, continued

Link Pass Through

Link Pass Through is a troubleshooting feature that allows the media converter to monitor both the fiber and copper RX ports for loss of signal. In the event of a loss of RX signal on one media port, the converter will automatically disable the TX signal of the other media port, thus "passing through" the link loss. (see diagram below)

* End device automatically notified of link loss
* Prevents loss of valuable data unknowingly transmitted over invalid link

Note: Once the fault condition is resolved, the LNK/ACT LED will blink for 2 ~ 6 seconds while the connection is recovering from the failure.

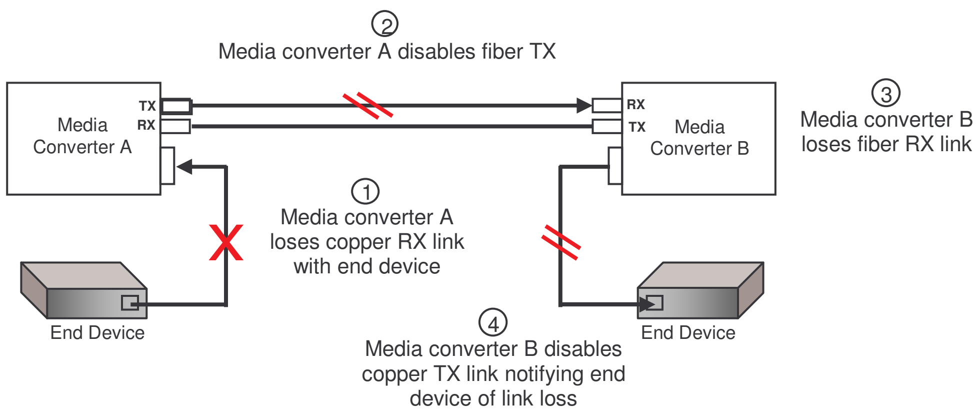


Figure 21: Link Pass Through illustration

Section IV:
Cable Specifications

Introduction

This section provides copper and fiber cable specifications.

In this section

These are the topics:

Copper *(RJ-45)* cable specifications

Copper cabling

Shielded twisted-pair (STP) or unshielded twisted-pair (UTP) cabling may be used and can be configured as either Straight-through or crossover – see figure 22.

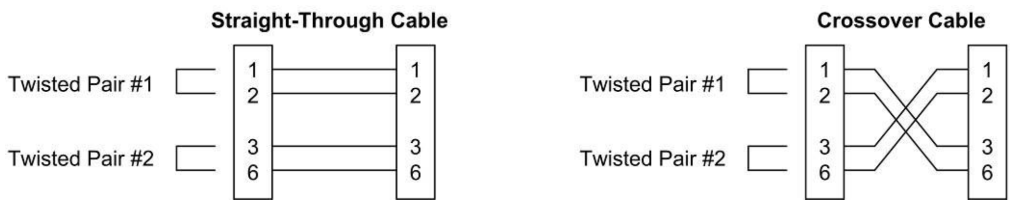


Figure 22: Straight-Through and Crossover Cables

Note: The AutoCross™ feature determines the characteristics of the cable connection and automatically configures the unit to link up, regardless of the cable configuration, allowing either straight-through (MDI) or crossover (MDI-X) cables to be used. (Requires no operator intervention.). See Advanced Features section for more information.

Copper cable specifications

Wire category:	Category 5 (minimum)
Attenuation:	22.0 dB /100m @ 100 MHz
Gauge:	24 to 22 AWG
Maximum cable distance:	100 meters *(328 ft)*

RJ-45 pinouts

Figure 23 shows the RJ-45 connector pin assignment chart for 10Base-T or 100Base-TX.

No	MDI Signal Name	MDI-X Signal Name
1	Receive Data + (RD+)	Transmit Data + (TD+)
2	Receive Data - (RD-)	Transmit Data - (TD-)
3	Transmit Data + (TD+)	Receive Data + (RD+)
6	Transmit Data - (TD-)	Receive Data - (RD-)

Figure 23: RJ-45 Connector Pin Assignment Chart

Note: The Media Converter is configured as a MDI-X device.

Fiber cable and optic specifications

Fiber cable characteristics

Cable physical characteristics must meet or exceed IEEE 802.3™ specifications.

Parameter	Specification
Bit Error Rate:	$<10^{-9}$
Single mode fiber:	9 µm
Multimode fiber:	62.5/125 µm
Multimode fiber:	100/140, 85/140, 50/125 µm

Fiber optic specifications

The following shows the fiber optic specification:

Fiber Cable	Specifications	
SISTG1040-111-LR(T)	Values will be determined by the SFP used	
Fiber-optic transmitter power:		
Fiber-optic receiver sensitivity:		
Link budget:		
SISTG1013-111-LR(T)	850 nm multimode	
Fiber-optic transmitter power:	min: -9.0 dBm	max: -1.0 dBm
Fiber-optic receiver sensitivity:	min: -19.0 dBm	max: -1.0 dBm
Link budget:	10.0dB	
SISTF1014-111-LR(T)	1310 nm single mode	
Fiber-optic transmitter power:	min: -9.5 dBm	max: -3.0 dBm
Fiber-optic receiver sensitivity:	min: -20.0 dBm	max: -3.0 dBm
Link budget:	10.5 dB	

Note: The fiber optic transmitters on this device meet Class I Laser safety requirements per IEC-825/CDRH standards and comply with 21CFR1040.10 and 21CFR1040.11.

Section V: Troubleshooting

Introduction

This section provides basic troubleshooting information for the Media Converter via a problem and corrective action table. The problems are stated in the problem column and the action(s) to take for the problem is stated in the corrective action column. If the corrective measures listed do not correct the problem, contact our 24-Hour Technical Support department at 1-800-260-1312, International: 00-1-952-941-7600.

In this section

These are the topics:

Troubleshooting problem and corrective action table

Problem	Potential Cause	Potential Solution
Media Converter does not power up	• Is the wired terminal-block plug fully inserted into the Media Converter?	• Wire and insert the terminal-block plug into the Media Converter's terminal block – See pages 12-16
	• Is the power LED lit?	• Check that DC power is at the recommended levels. • Contact Technical Support. US/Canada: 1-800-260-1312, International: 00-1-952-941-7600
No link or activity on the UTP port	• Is the power LED lit?	• Check that the power is turned ON.
	• Is the UTP cable properly installed at both ends?	• Verify that the cable at both ends is properly inserted into the UTP port
	• Is Link Pass Through enabled (DIP switch #2 ON)? **Note:** LPT requires both a copper and fiber connection at the same time to establish link	• Verify that both the fiber cable and UTP cables are properly installed on both ends • Disable DIP switch #2 (OFF) – if LNK/ACT lights, check the fiber cabling and re-enable DIP switch #2 • Contact Technical Support. US/Canada: 1-800-260-1312, International: 00-1-952-941-7600
No link or activity on the Fiber port	• Is the power LED lit?	• Check that the power is turned ON.
	• Is the Fiber cable properly installed at both ends?	• Verify that the cable at both ends is properly inserted into the fiber port
	• Is Link Pass Through enabled (DIP switch #2 ON)? **Note:** LPT requires both a copper and fiber connection at the same time to establish link	• Verify that both the fiber cable and UTP cables are properly installed on both ends • Disable DIP switch #2 (OFF) – if LNK/ACT lights, check the UTP cabling and re-enable SIP switch #2 • Contact Technical Support. US/Canada: 1-800-260-1312, International: 00-1-952-941-7600
Alarm contacts not working	• Is the wired terminal-block plug fully inserted into the Media Converter?	• Wire alarm contacts and circuit and insert the terminal-block plug into the Media Converter's terminal block – See pages 16-17
	• Is the alarm circuit wired for normally-open contacts?	• Check that alarm circuit is wired correctly – See pages 16-17 • Contact Technical Support. US/Canada: 1-800-260-1312, International: 00-1-952-941-7600

Section VI:
Contact Us, Warranty, & Compliance Information

Introduction

This section explains how to contact Transition Networks via Phone, fax, email, and direct mail. It also explains:

- What the warranty covers
- Who to contact to return product
- How and where to return the product
- Industry standards compliance

In this section

These are the topics:

Contact us

Technical support	Technical Support is available 24 hours a day. United States: 1-800-260-1312 International: 00-1-952-941-7600
Live Web chat	Chat live via the Web with a Transition Networks Technical Support Specialist. Log onto www.transition.com and click the Transition Now link.
Web-based training	Transition Networks provides 8-10 seminars per month via live web-based training. Log onto www.transition.com and click the Learning Center link.
E-Mail	Ask a question anytime by sending an e-mail message to our technical support staff at: techsupport@transition.com
Address	Transition Networks 10900 Red Circle Drive Minnetonka, MN 55343, U.S.A. Telephone: 952-941-7600 Toll free U.S.A & Canada: 800-526-9267 Fax: 952-941-2322

Warranty

Limited lifetime warranty

Effective for products shipped May 1, 1999 and after, every Transition Networks' labeled product will be free from defects in material and workmanship for its lifetime. This warranty covers the original user only and is not transferable.

What the warranty does not cover

This warranty does not cover damage from accident, acts of God, neglect, contamination, misuse or abnormal conditions of operation or handling, including over-voltage failures caused by use outside the product's specified rating, or normal wear and tear of mechanical components. If the user is unsure of the proper means of installing or using the equipment, contact Transition Networks' free technical support services.

Warranty Service

Transition Networks will at its option:

- Repair the defective product to functional specification at no charge
- Replace the product with an equivalent functional product
- Refund the purchase price of a defective product

Who to contact for returns

To return a defective product for warranty coverage, contact Transition Networks' technical support department for a return authorization number (RAN). Transition's technical support department can be reached through any of the following means:

Technical Support is available 24 hours a day:

- Tel: 800-260-1312 x 200 or 952-941-7600 x 200
- Fax: 952-941-2322
- Email: techsupport@transition.com
- Live web chat: Transition Now
- Voicemail: 800-260-1312 x 579 or 952-941-7600 x 579
- All messages will be answered within one hour

How and where to send the returns

Send the defective product postage and insurance prepaid to the following address:

CSI Material Management Center
c/o Transition Networks
10900 Red Circle Drive
Minnetonka, MN 55343 U.S.A.
Attn: RETURNS DEPT: Credit Return Authorization (CRA)# or Return Material Authorization (RMA) # ___________

Failure to protect the product during shipping may void this warranty. The return authorization number must be written on the outside of the carton to ensure its acceptance. We cannot accept delivery of any equipment sent to us without a CRA or RMA number.

Continued on next page

Warranty, continued

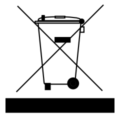
Customer pays non-compliant return costs	The customer must pay the non-compliant product(s) return transportation cost to Transition Networks for evaluation of said product(s) for repair or replacement. Transition Networks will pay for shipping the repaired or replaced in-warranty product(s) back to the customer *(any and all customs charges, tariffs, or/and taxes are the customer's responsibility).*
Non-warranty repair costs	Before making any non-warranty repair, Transition Networks requires a $200 charge, plus actual shipping costs to and from the customer. If the repair is greater than $200, an estimate is issued to the customer for authorization of repair. If no authorization is obtained, or the product is deemed not repairable, Transition Networks will retain the $200 service charge and return the product to the customer not repaired.
Repaired non-warranty products	Non-warranted products repaired by Transition Networks for a fee will carry a 180-day limited warranty. All warranty claims are subject to the restrictions and conventions set forth by this document. Transition Networks reserves the right to charge for all testing and shipping incurred, if after testing, a return is classified as "No Problem Found."
This warranty is your only remedy	This warranty is your only remedy. No other warranties, such as fitness for a particular purpose, are expressed or implied. Transition Networks is not liable for any special, indirect, incidental or consequential damages or losses, including loss of data, arising from any cause or theory. Authorized resellers are not authorized to extend any different warranty on Transition Networks' behalf.

Compliance information

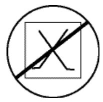
Compliances	CISPR22/EN5022 Class A + EN55024; EN60950 Class A; FCC Class A; CE Mark
UL Listed; C-UL Listed *(Canada)*	The following part numbers are UL Listed: SISTG1040-111-LR, SISTG1040-111-LRT, SISTG1013-111-LR, SISTG1013-111-LRT, SISTG1014-111-LR, SISTG1014-111-LRT.
FCC Regulations	This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at the user's own expense.
Canadian Regulations	This digital apparatus does not exceed the Class A limits for radio noise for digital apparatus set out on the radio interference regulations of the Canadian Department of Communications. Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la Class A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.
European Regulations	⚠ **CUATION:** This is a Class A product. In a domestic environment, this product could cause radio interference in which case the user may be required to take adequate corrective measures. Achtung ! Dieses ist ein Gerät der Funkstörgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerätes Rundfunkstörungen auftreten. In diesem Fäll ist der Benutzer für Gegenmaßnahmen verantwortlich. Attention ! Ceci est un produit de Classe A. Dans un environment domestique, ce produit risque de créer des interférences radioélectriques, il appartiendra alors à l'utilsateur de prende les measures spécifiques appropriées.

European Regulations, *(continued)*

In accordance with European Union Directive 2002/96/EC of the European Parliament and of



the Council of 27 January 2003, Transition Networks will accept post usage returns of this product for proper disposal. The contact information for this activity can be found in the 'Contact Us' portion of this document.



CAUTION: RJ connectors are NOT INTENDED FOR CONNECTION TO THE PUBLIC TELEPHONE NETWORK. Failure to observe this caution could result in damage to the public telephone network.

Der Anschluss dieses Gerätes an ein öffentlickes Telekommunikationsnetz in den EG-Mitgliedstaaten verstösst gegen die jeweligen einzelstaatlichen Gesetze zur Anwendung der Richtlinie 91/263/EWG zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über Telekommunikationsendeinrichtungen einschliesslich der gegenseitigen Anerkennung ihrer Konformität.

Appendix A:
Technical Specifications

SISTG10xx-111-LR(T) specifications, notices, and warnings

Parameter	Description
Standards	IEEE 802.3™, IEEE 802.3ab, IEEE 802.3u, IEEE 802.3x, IEEE 802.3z
Regulatory Compliance for Emissions	CISPR/EN55022 Class A; FCC Class A; CE Mark;
Safety Compliance	UL 60950; cUL; CE/EN60950-1
EMI Compliance	EN61000-4-2; EN61000-4-3; EN61000-4-4; EN61000-4-5; EN61000-4-6
Environmental Compliance	IEC60068-2-32 (Free fall) IEC60068-2-27 (Shock) IEC60068-2-6 (Vibration)
Ports	(1) fiber port single mode/multi-mode or SFP port (empty) (1) RJ-45 port
Fiber Optic Specifications	850 nm Multimode TX power: min: -9.0 dBm max: -1.0 dBm RX power: min: -19.0 dBm max: -1.0 dBm Link budget: 10.0dB 1310 nm Single mode TX power: min: -9.5 dBm max: -3.0 dBm RX power: min: -20.0 dBm max: -3.0 dBm Link budget: 10.5dB
Max Distance	Fiber (fixed): up to 10km *(6.2 miles)* Fiber (SFP): dependant on SFP Copper: up to 100 meters *(328 ft.)*
Max Data Rate	Fiber: 1000 Mb/s Copper: 10Mb/s or 100Mb/s or 1000Mbps
Signals	TxD, RxD, CTS, RTS, DTR, DSR, RI, DCD, GND
Power Consumption	5.3 watts
Ingress Protection	IP30
MTBF (MIL-HDBK-217F)	SISTG1040-111-LR(T): 525,424 hours SISTG10xx-111-LR(T): 443,839 hours
Input Power	12 to 48 VDC, 0.2A-0.7A; dual, redundant auto-sensing inputs with reverse polarity and overload current protection
Dimensions	**Width**: 1.2" [30 mm] **Depth:** 3.7" [95 mm] **Height:** 5.5" [140 mm]
Weight	0.45 kg *(1.0 lbs)*
Shipping weight	0.59 kg *(1.3 lbs)*
Standard Operating Temperature (-LR models only)	-10ºC to +50ºC *(32 ºF to 140ºF)*
Extended Operating Temperature (-LRT models only)	-40ºC to +65ºC *(-40 ºF to 167ºF)*
Storage Temperature	-40ºC to +85ºC *(-40 ºF to 185ºF)*
Operating Humidity	5% to 90% *(non-condensing)*
Warranty	Lifetime

SISTG10xx-111-LR(T) specifications, notices, and warnings, continued

Notices

- The information in this user's guide is subject to change. For the most up-to-date information on the SISTG10xx-111-LR(T) Industrial Media Converter, please refer to the user's guide on-line at: www.transition.com**.**
- Product is certified by the manufacturer to comply with DHHS Rule 21/CFR, Subchapter J applicable at the date of manufacture.
- IMPORTANT Copper based media ports: e.g., Twisted Pair (TP) Ethernet, USB, RS-232, RS422, RS485, DS1, DS3, Video Coax, etc., are intended to be connected to intra-building *(inside plant)* link segments that are not subject to lightening transients or power faults. Copper based media ports: e.g., Twisted Pair (TP) Ethernet, USB, RS-232, RS-422, RS-485, DS1, DS3, Video Coax, etc., are NOT to be connected to inter-building *(outside plant)* link segments that are subject to lightening transients or power faults. Failure to observe this caution could result in damage to equipment.

Warnings

WARNING: Visible and invisible laser radiation when open: Do not stare into the beam or view the beam directly with optical instruments. Failure to observe this warning could result in an eye injury or blindness.

WARNING: Use of controls, adjustments or the performance of procedures other than those specified herein may result in hazardous radiation exposure.